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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,465	09/27/2001	Koji Hasegawa	KOJIM-428	9545

23599 7590 10/20/2003

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EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 10/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/963,465

Applicant(s)

HASEGAWA ET AL.

Examin r

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-12 is/are allowed.
- 6) ☒ Claim(s) 13-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is written in reference to application number 09/963,465 filed on September 27, 2001, which was published as US 2002/0061465 A1 on May 23, 2002.

Response to Amendment

1. Claims 1-3 and 8 have been amended. Claims 9-20 have been newly added. Claims 1-20 are currently pending.

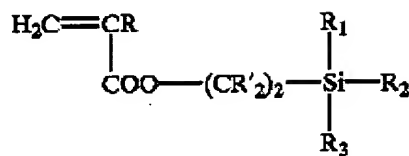
Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 13-15 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (US 5,985,524 A). Allen claims a process for generating a bilayer resist image on a substrate comprising the steps of (a) coating a substrate with an organic underlayer; (b) coating the underlayer with a top layer comprising a radiation sensitive acid generator and a polymer formed by copolymerizing (i) hydroxystyrene with (ii) a second monomer and optionally with (iii) a third monomer optionally substituted with an acid cleavable group; (c) imagewise exposing the top layer to radiation; (d) developing the image in the top layer; and (e) transferring the image through the organic underlayer to the substrate (cl. 29; see also c. 3, l. 49-c. 4, l. 55). The second monomer of the said polymer

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preferably has the structure:

wherein R is hydrogen or

methyl, R' is independently hydrogen, C₁₋₆ alkyl, phenyl or benzyl and R₁₋₃ are independently selected from the group consisting of hydrogen, C₁₋₆ alkyl and Si(R₄)₃ wherein R₄ is independently hydrogen or lower alkyl (cl. 30). It is the examiner's position that the limitations of the instant claims are met when R₁₋₃ of the taught structure is independently C₁₋₆ alkyl. Specifically, the said monomer would meet the limitations of claimed formula 2 wherein R¹⁻⁴ is hydrogen or alkyl group having 1-6 carbon atoms, m is 1, and R⁵⁻⁷ are alkyl groups.

Allen also teaches the use of an acrylate or methacrylate polymer having an acid cleavable silylethoxy group attached to the carbonyl group of the (meth)acrylate. The said (meth)acrylate can be copolymerized with comonomers including (i) (meth)acrylate monomers with lower alkyl groups, (ii) (meth)acrylic acid monomers, (iii) (meth)acrylate monomers with other types of acid labile esters groups such as tertiary alkyl ester or (iv) hydroxystyrene (c. 2, l. 53-64). It is the examiner's position that (meth)acrylic acid monomers meet the limitations of claimed formula (73) of instant claims 13 and 14. It would have been obvious to one of ordinary skill in the art to substitute the hydroxystyrene of claim 30/29 for a/an (meth)acrylic acid monomer and expect reasonably similar results.

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4. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (US 5,985,524 A) as applied to claims 13-15 and 19-20 above, and further in view of Allen et al. (US 5,580,694 A) and Choi (US 6,045,970 A).

Allen ('524) teaches all the limitations of the instant claims except it fails to claim the use of a basic compound and a dissolution inhibitor as set forth in instant claims 16-18. Allen does however teach that the top imaging layer may optionally comprise other minor components such as dissolution inhibitors, coating enhancers, surfactants, bases and other compounds known to those in the art (c. 3, l. 38-41).

Allen (US 5,580,694) teaches the use of a mono-, di- or tri-protected hydroxy androstane-17-alkylcarboxylate as conventional dissolution inhibitors. Photogenerated free acid causes cleavage of the alkylcarboxylate ester to form free acid, converting the androstane molecule from dissolution inhibitor to dissolution enhancer. Preferred compounds are t-butyl 3-acetylthiocholate and t-butyl 3-trifluoroacetylthiocholate (c. 3, l. 1-46). One of ordinary skill in the art would have been motivated by the teaching of Allen to incorporate a dissolution inhibitor having an acid labile group such as t-butyl 3-acetylthiocholate and t-butyl 3-trifluoroacetylthiocholate into the taught composition of Allen ('524) in order to improve the etch resistance for subsequent process steps (Allen '694 c. 4, l. 54-55).

Choi (US 6,045,970 A) teaches that organic bases such as triethylamine, triisobutylamine and triethanolamine are used in photoresist compositions to prevent a decrease in the critical size of the pattern after exposure, caused by acid diffusing from an exposed portion of the photoresist to an unexposed portion (c. 4, l. 23-31). One of ordinary skill in the art would have been motivated by the teaching of Choi to incorporate a base such

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as triethylamine, triisobutylamine and triethanolamine into the taught composition of Allen ('524) in order to decrease the critical size of the pattern after exposure (Choi c. 4, l. 23-31).

Response to Arguments

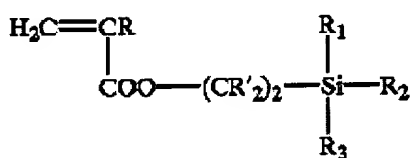
5. Applicant's arguments, with respect to instant claims 1-12 have been fully considered and are persuasive. The rejections of the said claims over prior art references of Allen and Brock have been withdrawn.

6. Applicants have submitted new claims 13-20, which contain a definition for R1 and R2, which was presented in the original claims. The examiner is of the position that the prior art reference of Allen, as discussed above, it still applicable to claims 13-20 as presented.

Allowable Subject Matter

7. Claims 1-12 are allowed.

8. The following is an examiner's statement of reasons for allowance: by Allen et al. (US 5,985,524 A). Allen claims a polymer comprising the structure:



wherein R is hydrogen or methyl, R' is independently hydrogen, C₁₋₆ alkyl, phenyl or benzyl and R_{1,3} are independently selected from the group consisting of hydrogen, C₁₋₆ alkyl and Si(R₄)₃ wherein R₄ is independently hydrogen or lower alkyl (cl. 30). The prior art reference of Allen fails to teach and/or suggest a compound wherein at least one of R1 and R2 is a C₁₋₂₀ cyclic alkyl group and the other is hydrogen.

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9. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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14. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

yct

October 9, 2003


JANET BAXTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700